REMARKS

Claims 1-23 were pending and considered. In an Office Action designated as final, claims 1-23 were rejected. In response, Applicant hereby submits a Terminal Disclaimer and the following remarks. Reconsideration and allowance are respectfully requested.

Claims 1-4 have been rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-21 of U.S. Patent 6,673,211. In response, Applicant hereby submits a Terminal Disclaimer disclaiming the terminal part of any patent granted on the present patent application which would extend beyond the expiration date of U.S. Patent No. 6,673,211. It is respectfully submitted that the Terminal Disclaimer submitted herewith overcomes the rejection for obviousness type double patenting, and the rejection should be removed.

Since no other rejections have been made with respect to claims 1-4, it is respectfully submitted that claims 1-4 are now in condition for allowance. An indication of such is respectfully requested.

Claims 5-23 have been rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-32 and 1-12 of U.S. Patents 6,413,365 and 6,458,241. At the present time, a Terminal Disclaimer to overcome this rejection is not being submitted in that claims 5-23 also have been otherwise rejected. If claims 5-23 are found allowable except for the obviousness-type double patenting rejection, an appropriate terminal disclaimer or disclaimers will be submitted.

Claims 5-23 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over United States Reissue Patent 35,460 (Klungness et al.). In remarks, the Examiner states that the reasons for the rejection are the same as in the previous Office Action mailed March 30, 2004.

In commenting on Applicant's arguments submitted in the previous Amendment, the Examiner states that, "There is no limitation in the claim of any specific range of shear that the present invention operates within. There is inherently some degree of shear present during the mixing of the fiber suspension in the present invention." It appears from this comment by the Examiner that the Examiner has not entirely understood the argument made previously. Accordingly, Applicant respectfully requests the Examiner consider the following additional remarks with regard to the differences between the present invention and Klungness et al.

To again summarize, Klungness et al. teaches a fiber loading process using high shear mixing. Klungness et al. specifically teaches that high shear is required. For example, Klungness et al. states:

> It has been determined that for fibers containing from about 95% to about 85% of moisture (5% to 15% of fiber) and the same calcium oxide loading, that high shear treatment during contact with the carbon dioxide is required to cause complete precipitation of calcium carbonate. In this connection, any suitable high shear mixing device can be used. Preferably, the high shear treatment is sufficient to impart from about 10 to about 70 watt hours of energy per kilo of fiber, dry weight basis. (Klungness et al., column 6, lines 56-64. Emphasis added.)

Klungness et al. further states:

> It has been determined that a simple way to provide contact of the carbon dioxide with the paper pulp under high shear treatment is by means of a pressurized refiner (Klungness et al., column 6, lines 65-67. Emphasis added.)

Klungness et al. states that the pressurized refiner is "a well known piece of apparatus" having discs "spaced apart by a distance sufficient to shred the pulp crumbs as the pulp passes between the stationary disc and the revolving disc" (column 7, lines 1-13). Klungness et al. dismisses the use of low shear, stating, "The quality of hand sheets prepared from pulp wherein the precipitation is affected with the pressurized refiner is, however, superior." (column 7, lines 35-41).

Klungness et al clearly teaches a process that requires high shear treatment of pulp. In contrast thereto, the present invention, as recited in claim 5, is a method including steps of:

> **providing a rotor and stator assembly including a rotor and a stator defining a gap therebetween of between about 3 mm and 75 mm.;**
> **passing the fiber suspension through the gap together with the at least one of calcium hydroxide and calcium oxide and the at least one of carbon dioxide, ozone and steam; and**
> **rotating the rotor during said passing step and controlling the rotational speed of the rotor to provide a tangential velocity of between about 20 and 100 meters per second.** (Emphasis added.)

Further, claim 22 recites a method including steps of:

> **passing the mixture through a gap between a rotor and stator while rotating the rotor; and**
> **controlling the gap and rotational speed of the rotor to provide low shear treatment of the fibers.** (Emphasis added.)

Thus, in contrast to the teaching of Klungness et al, which specifically requires high shear treatment of the pulp, claim 22 specifically recites low shear treatment, and claim 5 recites conditions including a rotor stator gap of 3-75 mm which inherently provides low shear treatment. Accordingly, the present invention, as recited in the claims, is opposite the teaching of Klungness et al. Klungness et al teaches that it is necessary to use high shear treatment to adequately performing fiber loading. The present invention recites a treatment method using low shear.

In a high shear refining process, or other high shear treatment, significant alternations and changes are performed on the fibers processed therein. In a narrow refining gap, as the fibers pass between confronting surfaces, mechanical and hydrodynamic forces create the refining effect. Fibers gather in wads in the refining gap as confronting edges of the opposed refining plates approach each other. Localized dewatering occurs as the wads are subjected to compression in the refining gap between the confronting surfaces of the refiner plates. Water reabsorption occurs as the confronting surfaces pass one another. The intense interaction of fibers against the refiner plate surfaces, and fibers against other fibers causes physical alterations to the fibers.

Primary effects on the fibers from high shear refining include:

- Breaking and partial removal of primary cell walls, forming debris and fines.
- Internal fibrillation with penetration of water into cell walls and breaking hydrogen bonds, causing swelling.
- Increased fiber flexibility as the cell wall collapses into the lumen.
- External fibrillation further increasing fines production.
- Fiber shortening.

Secondary effects on the fibers from high shear refining include:

- Fractures in the cell walls.
- Fiber stretching and/or compression.
- Partial solubilization of fiber components (hemicellulose).
- Molecular fibrillation.
- Straightening of fibers (at low consistency).
- Curling of fibers (at high consistency).

The result is a substantial change in the physical characteristics of the fibers treated in a high shear process and subsequent resultant changes in characteristics of products made from the fibers subjected to high shear treatment. The process taught by Klungness et al necessarily results in similar changes, because high shear treatment is used to load the fibers.

In contrast, the present invention specifically recites low shear treatment of the fibers (claim 22), and conditions including wide rotor to stator gap placements and low energy input (claim 5) which result in a low shear treatment of the fibers. Hence, physical characteristics of the fibers are not changed significantly by the loading process itself. Thus, better control of fiber characteristics is available in subsequent or prior steps, since the performance of the fiber loading in and of itself does not substantially alter fiber characteristics. Fibers can be loaded without changing significantly the aforementioned physical characteristics.

The Examiner's comment seems to suggest that Applicant has argued that a no shear treatment is used. Applicant has not suggested that the present invention provides no shear. Instead, Applicant has specifically recited low shear (claim 22), and has specifically recited conditions (claim 5) which would not result in a high shear treatment. The present invention provides an improved process having improved fiber characteristic control. Accordingly, Applicant respectfully submits that claims 5 and 22, as well as the claims dependent therefrom recite an invention not taught by Klungness et al. and should be allowed over the teaching of Klungness et al.

For the foregoing reasons, Applicant submits that no combination of the cited references teaches, discloses or suggests the subject matter of the amended claims. The pending claims are therefore in condition for allowance, and Applicant respectfully requests withdrawal of all rejections and allowance of the claims.

In the event Applicant has overlooked the need for an extension of time, an additional extension of time, payment of fee, or additional payment of fee, Applicant hereby conditionally petitions therefor and authorizes that any charges be made to Deposit Account No. 20-0095, TAYLOR & AUST, P.C.

Should any question concerning any of the foregoing arise, the Examiner is invited to telephone the undersigned at (260) 897-3400.

Respectfully submitted,

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I hereby certify that this correspondence is being transmitted via facsimile to the U.S. Patent and Trademark Office, on: January 24, 2005.

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January 24, 2005
Date